

What is claimed is:

1. A method for separating sugars from a biomass hydrolyzed by an aqueous acidic solution which comprises:
providing a hydrolysis vessel for hydrolysis of a biomass, and
providing a supply of said biomass to said hydrolysis vessel, and
providing a supply of said aqueous acidic solution to said hydrolysis vessel, and
providing a phase forming vessel, and
subjecting said biomass, contained within said hydrolysis vessel, to hydrolysis by said aqueous acidic solution to form a hydrolysate containing sugars, and
withdrawing said hydrolysate from said hydrolysis vessel, and
transferring said hydrolysate to said phase forming vessel to form two mutually insoluble phases; a sugar phase and an aqueous acidic solution phase, and
separating solid sugar from said phase forming vessel, and
separating said aqueous acidic solution phase, from said phase forming vessel, for subsequent recycle to said hydrolysis vessel, and
withdrawing residue, remaining from hydrolysis of said biomass, containing lignins, from the hydrolysis vessel, thereby hydrolysis of a biomass forms a hydrolysate containing sugars and substantially separating sugars from the hydrolysate and withdrawing residue remaining from hydrolysis of the biomass from the hydrolysis vessel and the hydrolysate, with sugars substantially removed, to provide recycled aqueous acidic solution to the hydrolysis vessel.
2. The method of claim 1 wherein said hydrolysis vessel is established at a predetermined temperature of about 30°C. to about 45°C. and maintained at substantially isothermal conditions.
3. The method of claim 1 wherein said phase forming vessel is established at a predetermined temperature of about 0°C. and maintained at substantially isothermal conditions.
4. The method of claim 1 wherein said biomass is selected from the group consisting of wood, paper and lignocellulose materials including an individual or a combination thereof.
5. The method of claim 1 wherein said sugars consist of the group consisting of glucose and pentose sugars including an individual or a combination thereof.
6. The method of claim 1 wherein said sugars are subjected to fermentation to produce ethanol.
7. The method of claim 1 wherein said hydrolysate, withdrawn from said hydrolysis vessel, is subjected to a temperature of about 0°C.

8. The method of claim 1 wherein said hydrolysate is subjected to cooling, to produce a phase of sugars and a phase of said aqueous acidic solution.

9. The method of claim 1 wherein said residue, containing lignins, is filtered to produce filtered residue and a filtrate for recycle to the hydrolysis vessel.

10. The method of claim 9 wherein the filtered residue is subjected to extraction by water to produce water extracted residue and an aqueous extractate.

11. The method of claim 1 wherein said sugars are dissolved by an aqueous solution.

12. The method of claim 11 wherein the aqueous solution is supplied from a fermentation broth.

15 ~~13~~ 13. The method of claim 1 wherein said residue is subjected to filtering to produce filtered residue and a filtrate for recycle to said hydrolysis vessel.

~~16~~ 18 ~~14~~ 14. The method of claim 1 wherein said aqueous acidic solution contains sugars.

~~17~~ 19 ~~15~~ 15. The method of claim 1 wherein said aqueous acidic solution contains about 70% sulfuric acid.

Claims
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